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Amdt. dated November 18, 2004
Reply to Office Action of September 2, 2004

Status of the Claims

Claims 1-21 remain pending.

Rejections under 35 USC § 102

Claims 1-21 stand rejected under 35 USC §102(e) as being anticipated by U.S. Patent No. 6,246,716 ("Schneider").

"To anticipate a claim, the reference must teach every element of the claim." MPEP § 2131. Applicants traverse these rejections because the cited art fails to teach (or even suggest) every element of the claims.

For example, claim 1 recites that "the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals". The examiner cites Schneider at col. 8, ll. 39-46 as teaching PSD proportionality between uplink and downlink signals. The cited portion of Schneider notes only that the uplink and downlink signals are spectrally shaped, and references Figs. 5 and 6 for the shaping filter characteristics. The filter characteristics in Figs. 5 and 6 are clearly not proportional, as required by the claims. Schneider does not here or elsewhere teach a proportionality relationship between the uplink and downlink PSDs. For at least this reason, applicants maintain that claim 1 is allowable over the cited art.

Independent claim 2 recites in part:

> at frequencies below a selected frequency M_{E2F}, the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals by a positive scale factor, ...
> at frequencies above M_{E2F}, the power spectral density of the uplink signals are limited to one or more uplink frequency bands and the downlink signals are limited to one or more downlink frequency bands that are disjoint from the uplink frequency bands, and ... the total bandwidth of the uplink frequency bands is proportional to the total bandwidth of the downlink frequency bands by the same positive scale factor

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The examiner cites Schneider at col. 8, line 57 through col. 10, line 35; and col. 10, line 54 through col. 11, line 10; as teaching these limitations. The cited portions describe interference levels that may be expected from various other signaling schemes and the expected performance of Schneider's system in the presence of these interference levels. In the second cited portion, Schneider describes two "extreme" configurations for T1.413 ADSL and the expected interference levels from each. There is no teaching here or elsewhere in Schneider that the PSDs are proportional below some frequency and disjoint above the frequency as required by the claims. For at least this reason, applicants maintain that claim 2 is allowable over the cited art.

Independent claim 3 recites "when the connection is initialized, frequency bands are allocated to the uplink and downlink power signals so that the total uplink and downlink capacity is maximized over the channel for predetermined uplink and downlink average signal powers". The examiner cites Schneider at col. 8, line 57 through col. 10, line 35, as teaching these limitations. The cited portion describes interference levels that may be expected from various other signaling schemes and the expected performance of Schneider's system in the presence of these interference levels. Schneider fails to provide, in the cited portions or elsewhere, any teaching of maximizing the total uplink and downlink capacity. For at least this reason, applicants maintain that claim 3 is allowable over the cited art.

Independent claim 4 recites "transmitting a downlink signal with a transmitted downlink PSD that is proportional (but substantially unequal) to the transmitted uplink PSD". Independent claim 13 recites a modem configured to perform a similar operation. The examiner cites Schneider at col. 5, lines 44-58; col. 9, lines 7-25; and col. 12, lines 15-45 as teaching this limitation. In the first portion, Schneider teaches partially-overlapping PSDs with unequal transmit power and references Fig. 2. In the second portion, Schneider teaches unequal transmit powers and references Figs. 5-6. In the third portion, Schneider notes that his proposed system is not a "limiting impairment" for other transmission schemes because "the downstream transmitter of the PAM embodiment has a lower PSD than HDSL at all frequencies below 200KHz". Neither

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in the cited portions nor elsewhere does Schneider teach that the upstream and downstream power spectral densities are proportional. To the contrary, the referenced figures show PSDs that are clearly not proportional. For at least this reason, applicants maintain that independent claims 4 and 13, and their dependent claims 5 and 14, are allowable over the cited art.

> Independent claim 6 recites in part:
>
>> at frequencies below a selected frequency M_{E2F}, the transmitted downlink PSD is proportional to the transmitted uplink PSD by a positive scale factor, [and] at frequencies above the selected frequency M_{E2F}, the transmitted downlink PSD is … disjoint from … the transmitted uplink PSD

Independent claim 15 recites a modem having similar limitations. The examiner relies on the same portions of Schneider as those cited against claim 2 above. As argued previously, there is no teaching here or elsewhere in Schneider that the PSDs are proportional below some frequency and disjoint above the frequency as required by the claims. For at least this reason, applicants maintain that claims 6 and 15, along with their dependent claims 7-8 and 16-17, are allowable over the cited art.

Independent claim 9 recites "jointly optimizing a transmitted uplink PSD and a transmitted downlink PSD to maximize a sum of uplink and downlink capacities subject to a predetermined average uplink power and a predetermined average downlink power, wherein the predetermined average uplink and downlink powers are unequal". Independent claim 18 recites a modem configured to perform a similar operation. The examiner cites Schneider at col. 6, line 57 through col. 7, line 26 as teaching this limitation. The cited portion of Schneider describes Schneider's use of partially-overlapping signal bandwidths "whereby the transmission range is increased and the interference into other services is minimized". Schneider does not here or elsewhere provide any teaching or suggestion of jointly optimizing uplink and downlink PSDs to maximize a sum of uplink and downlink capacities. For at least this reason, applicants maintain that independent claims 9 and 18, along with their dependent claims 10-12 and 19-21, are allowable over the cited art.